UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

December 5, 2016

Mr. Peter Thomas
Coaltec Energy USA, Inc.
5755 Apple Grove Lane
Crozet, VA 22932

Dear Mr. Thomas:

The U.S. Environmental Protection Agency (EPA) has received your request to determine whether 40 C.F.R. § 241 (the non-hazardous secondary material rule, or NHSM rule) and/or Clean Air Act (CAA) Section 129 rules for solid waste combustion apply to Coaltec's proposed use of poultry litter as feedstock in a gasifier. Specifically, according to information you provided, the proposed facility or facilities will be utilized on a regional scale to process 20,000-80,000 tons of poultry litter per year from several dozen farms on the eastern shore of the Chesapeake Bay. In order for EPA to proceed with our analysis, please provide the following information:

1. Identify the addresses/coordinates and acreage of the site or sites?

2. Please describe the status of construction and operating permits/applications, at each of the site or sites you identified in response to the above question.

Construction has not yet begun and permit applications have not yet been submitted.

3. Please provide a detailed process description for the entire process in which you are requesting an NHSM/Section 129 determination including any pre-gasification such as drying the manure or mixing with other fuel to increase the Btu value of the manure), gasification, and post-gasification (i.e. combustion of syngas in the thermal oxidizer).

Most of the as-delivered broiler litter will be an average of 30% moisture. At this moisture, the litter can be augered directly into each highly-automated, fixed-bed, refractory-lined, oxygen-starved, NRCS Conservation Practice 735-compliant gasifier at a rate of approximately 5,000 pounds per hour, 24 hours per day, 7 days per week. The litter is augered through the full length of the gasifier over a 2-hour period, with drying and syngas generation taking place in the upper section of the gasifier (see attached cut-away drawings). The red-hot, carbon-rich material drops over a wall into the lower section of the gasifier, where super-heated steam is carefully added in the reaction zone (see red arrow). The granular, steam-

activated carbon is augered through the lower section of the gasifier, where it begins to cool. It is then augered sideways out of the gasifier at 900 to 1,000 pounds per hour (see black arrow), where a light mist of clean water is sprayed on the activated carbon to further reduce the temperature and prevent any dustiness before it is bagged in 1,000-pound nylon supersacks.

During the gasification process, ambient air is carefully added to the refractory-lined thermal oxidizer (see blue arrows) in order to reduce and oxidize the syngases (see yellow arrows), but most importantly, in order to produce as much waste heat as possible for drying additional poultry litter in a large rotary drum dryer (see attached) to produce pathogen-free poultry bedding for sale to the growers, and in order to generate waste heat and steam for use by the adjacent feed mill.

It is important to note that on September 12, 2016, the EPA Region 3 Chesapeake Bay Program formally approved NRCS Conservation Practice Code 735 (gasification) as a new agricultural best management practice (BMP) for thermally treating animal waste on a large-scale, thereby reducing nitrogen and phosphorus pollution of the Chesapeake Bay watershed. Called MTT-4 by the Bay Program, this lab-verifiable, point-source nutrient removal BMP will be added to the Bay Model 6.0. Unlike the highly uncertain land-based BMPs such as cover crops, stream fencing and riparian buffers, MTT-4 gasification systems are point-source nutrient removal technologies, and they provide the following rates of phosphorus capture, conversion of nitrogen-rich syngases to N^2 (i.e. thermal reduction to N^2, the air we breathe), and nitrogen capture:

- 100% of the phosphorus (P) is captured in the solid, carbon-rich fraction;
- 85% of the nitrogen-rich compounds such as ammonia are reduced to N^2 gas; and
- 15% of the nitrogen is captured in the solid, carbon-rich fraction.

4. Provide temperature profile versus time data including, startup (before the poultry litter is fed), when poultry litter is fed and being gasified, after the gasification process is complete, and combustion of syngas (i.e. entire cycle).

The temperature in the upper stage of the oxygen-starved gasifier is approximately 900° F, the temperature in the steam-activation region of the gasifier is approximately 1,400° F, and the temperature in the thermal oxidizer is approximately 1,800° F. However, it must be noted that the gasifier has thermocouples and both the gasifier temperature and the rate at which the litter is augered through the gasifier are altered periodically by the system's PLC algorithm, depending on the moisture of the litter that is being processed.

5. Identify the auxiliary heat sources, if any. Indicate the temperature change in the temperature profile when auxiliary heat sources are turned off.

The poultry litter is the fuel and the heat source for around-the-clock operation of the gasification system. The only requirement for an external heat source such as propane is when the gasifier is cold and needs to be restarted (e.g. after maintenance). Once the gasifier is operating at approximately 900° F (roughly 2 hours), the two gas burners for the external heat source are turned off.

6. Identify the external heat sources that provide heat to the refractory liner, if any.

There is not a separate heat source for the refractory lining of the gasification system.

7. Describe the process upstream from the gasifier, including how, and by whom, the poultry litter is collected, managed and processed.

The poultry litter will be delivered to the regional gasification facility by litter brokers from several dozen poultry farms on the Delmarva Peninsula.

8. Describe how you will ensure that gasification/starved air conditions are maintained instead of combustion/oxidation conditions in the gasifier.

The conditions inside the gasifier are constantly monitored by thermocouples, oxygen-probes, and other sensors. The data from these sensors are read by a proprietary algorithm, and the PLC system assures that the oxygen-starved conditions inside the gasifier are properly maintained (see attached camera photo of the operator's touch-screen).

9. Provide the typical air-to-manure ratio. Describe the air supply conditions during the gasification process. Please indicate in the temperature profile if/when air is injected during the thermal gasification process.

See answers #3, # 4 and #5 above.

10. Describe any processing or gas cleaning of the syngas from the gasifier undergoes before it is routed to the thermal oxidizer.

The syngas is not cleaned or otherwise processed before it is drawn through the gasifier to the refractory-lined thermal oxidizer.

11. Provide any existing data on the heating value of the syngas (Btu per standard cubic feet converted to Btu/lb) and constituents/contaminants in the syngas.

Assuming that poultry litter has a fuel input value of 5,000 Btu per pound, when we process litter at 5,000 pounds per hour, the gross heat value of the fuel is 25 MMBtu per hour per gasifier. Of the 25 million Btu of heat input value, we are able to capture and utilize approximately 16 million Btu of waste heat per hour from each gasifier / thermal oxidizer system. Regarding constituents in the emissions, see attached 2009 GE Energy stack test conducted at an old model gasifier and a feed-in rate of 2,600 pounds per hour. To estimate the maximum emissions from the newer, more efficient model gasifier at a feed-in rate of 5,000 pounds of litter per hour, multiply these emissions by 1.923.

12. What will the biochar be used for, specifically? If you are creating a product, describe the type and market for it.

Coaltec's Ecochar® activated carbon will be sold for a wide variety of water purification, air purification, odor control and soil remediation applications.

13. What happens to the waste heat from the thermal oxidizer? Describe the planned use for the syngas for any electricity generation. Describe what other purposes the thermal oxidizer will have other than combusting/destroying the syngas and transferring the heat generated to drying the poultry litter.

At 30% moisture, the as-delivered broiler litter does not have to be dried before being augered into the gasifier at 5,000 pounds per hour, so as described in #3 above, a portion of the waste heat will be used to dry additional poultry litter for the production of pathogen-free bedding, and the balance of the waste heat will be used to generate steam and heat for drying.

14. During the conference call on October 27, 2016 between EPA and Coaltec, Coaltec indicated that the proposed facility would not produce electricity. We have seen similar units equipped to generate electricity. Is Coaltec aware of the exemption in the Clean Air Act, Section 129(g)(1)(b), excerpt below, from the definition of a solid waste incineration unit? If yes, please describe Coaltec's rationale not to produce electricity. If no, please discuss how this may change future plans for the proposed facility or facilities.

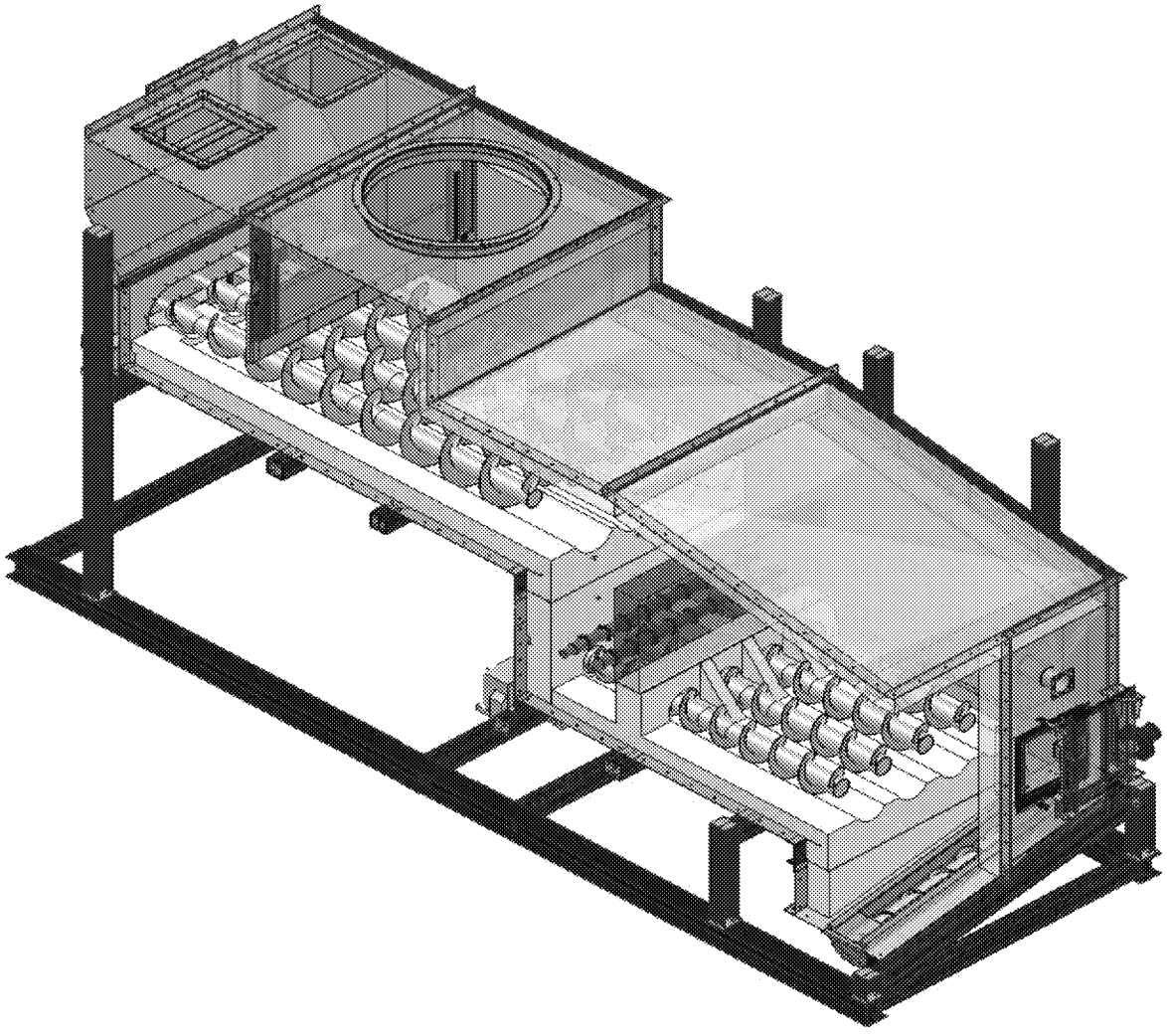
We are well aware of the potential to generate electricity using waste heat, but Coaltec's oxygen-starved gasification system will not be operated as an incinerator. If it were operated as an incinerator, the solid by-product will be ash, not activated carbon. The current price of poultry bedding on the Delmarva Peninsula is $0.51 per cubic foot or $500 per ton. It makes far more economic sense for Coaltec to use a portion of the waste heat to dry additional poultry litter (i.e. litter over and above what is processed through the gasifier) in order to produce pathogen-free bedding for sale to the growers and integrators at a discount from the current price, and use the balance of the waste heat to generate steam and dry heat for use by the adjacent feed mill. Naturally, we retain the option to cogenerate electricity if we wish.

> "The term "solid waste incineration unit" does not include... (b) Qualifying small power production facilities, as defined in Section 796(17)(C) of Title 16, or qualifying cogeneration facilities, as defined in section 796(18)(B) of Title 16, which burn homogeneous waste (such as units which burn tires or used oil, but not including refuse-derived fuel) for the production of electric energy or in the case of qualifying cogeneration facilities which burn homogeneous waste for the production of electric energy and steam or forms of useful energy (such as heat) which are used for industrial, commercial, heating or cooling purposes," 42 U.S. Code § 7429(g)(1)(b).

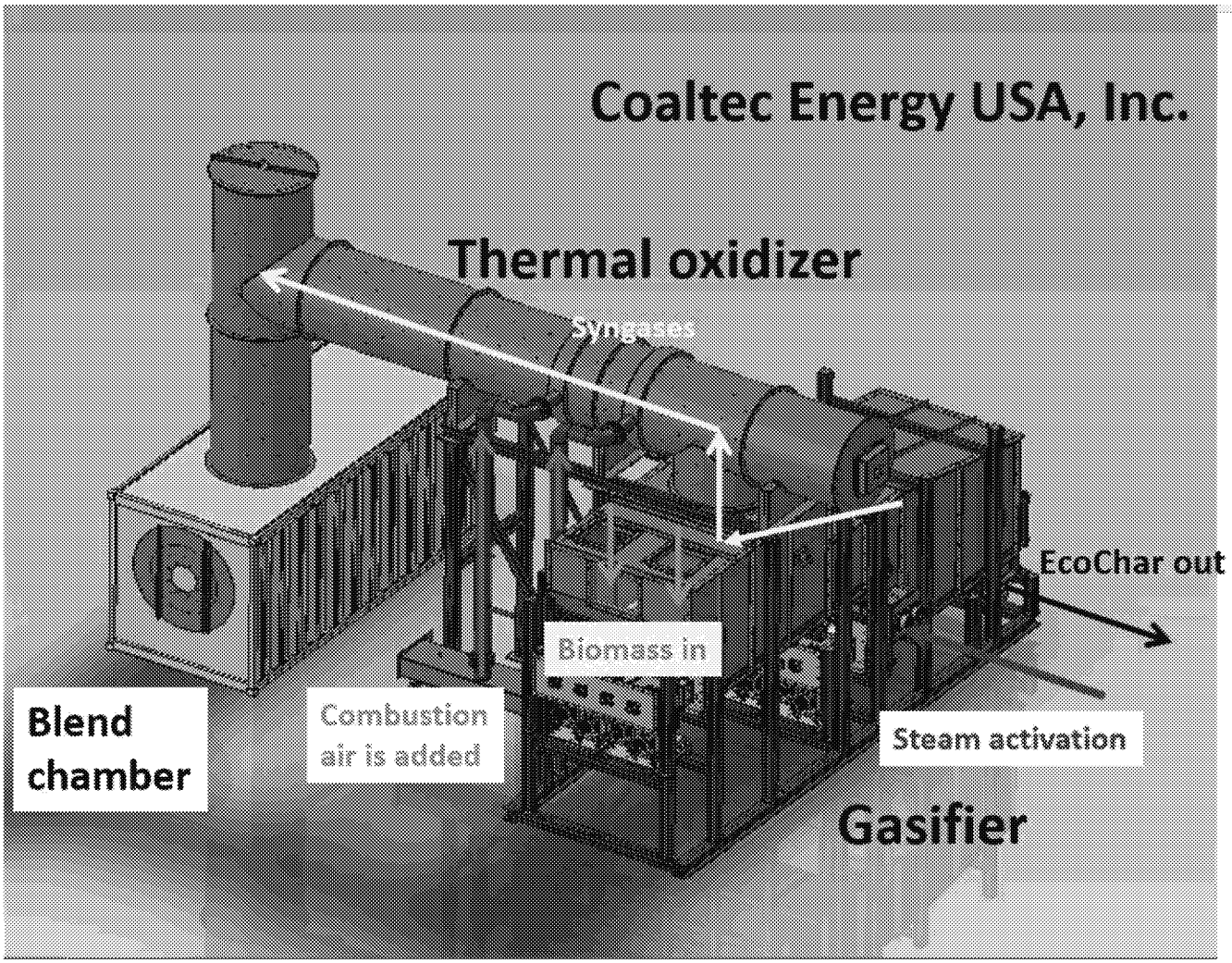
Our review of your request will resume upon receipt of the requested information. Please send a hard copy of the response to Catherine McGoldrick, US EPA Region III, 1650 Arch St (3LC50), Philadelphia, PA 19108-2029, and an electronic copy to mcgoldrick.catherine@epa.gov and gordon.mike@epa.gov. If you have any additional questions, please contact Catherine McGoldrick at (215) 814-3399 or Mike Gordon at (215) 814-2039.

Sincerely,

Catherine McGoldrick
Land and Chemicals Division (3LC50)

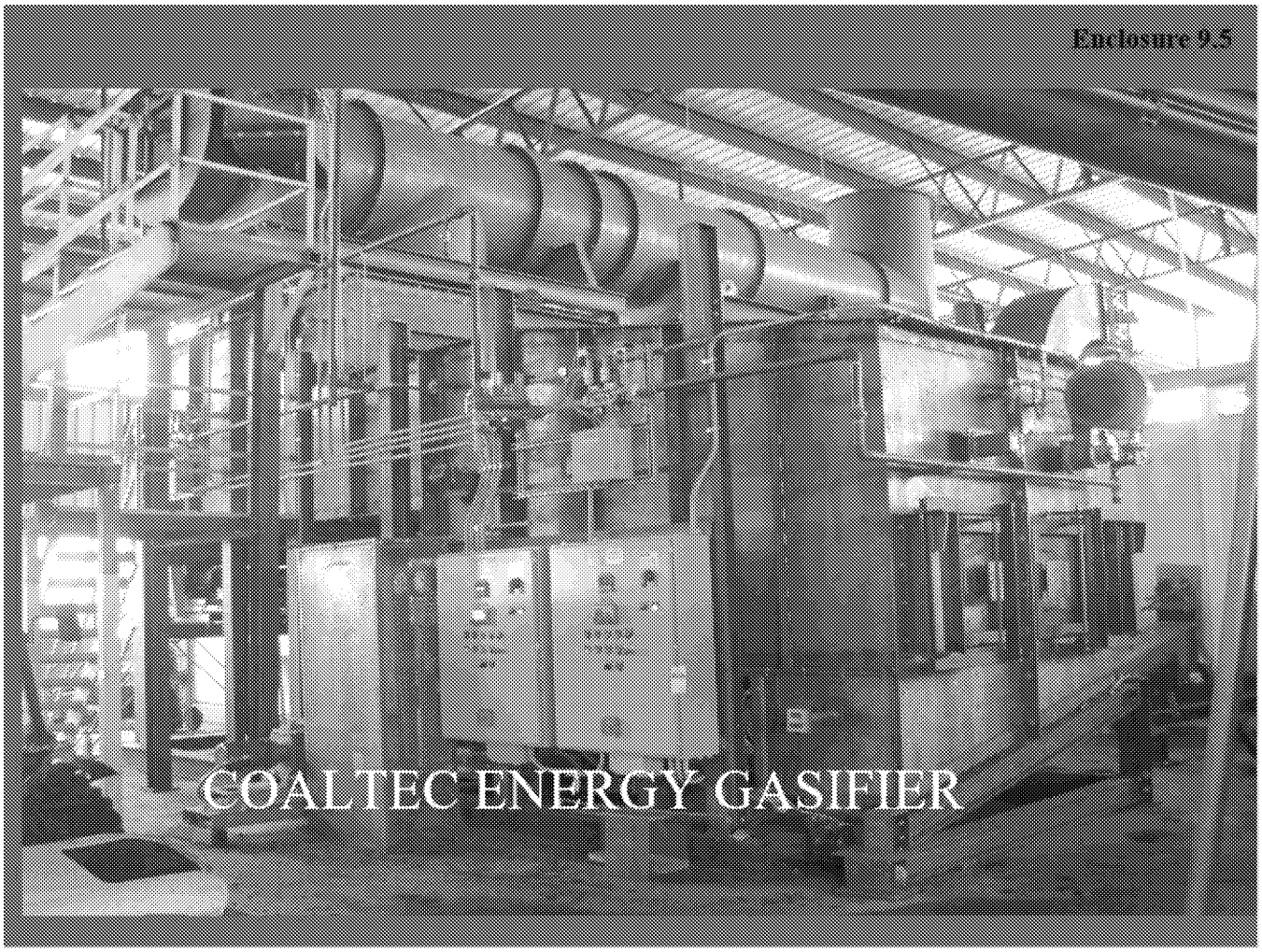


Cut-away view of the Coaltec Energy gasifier

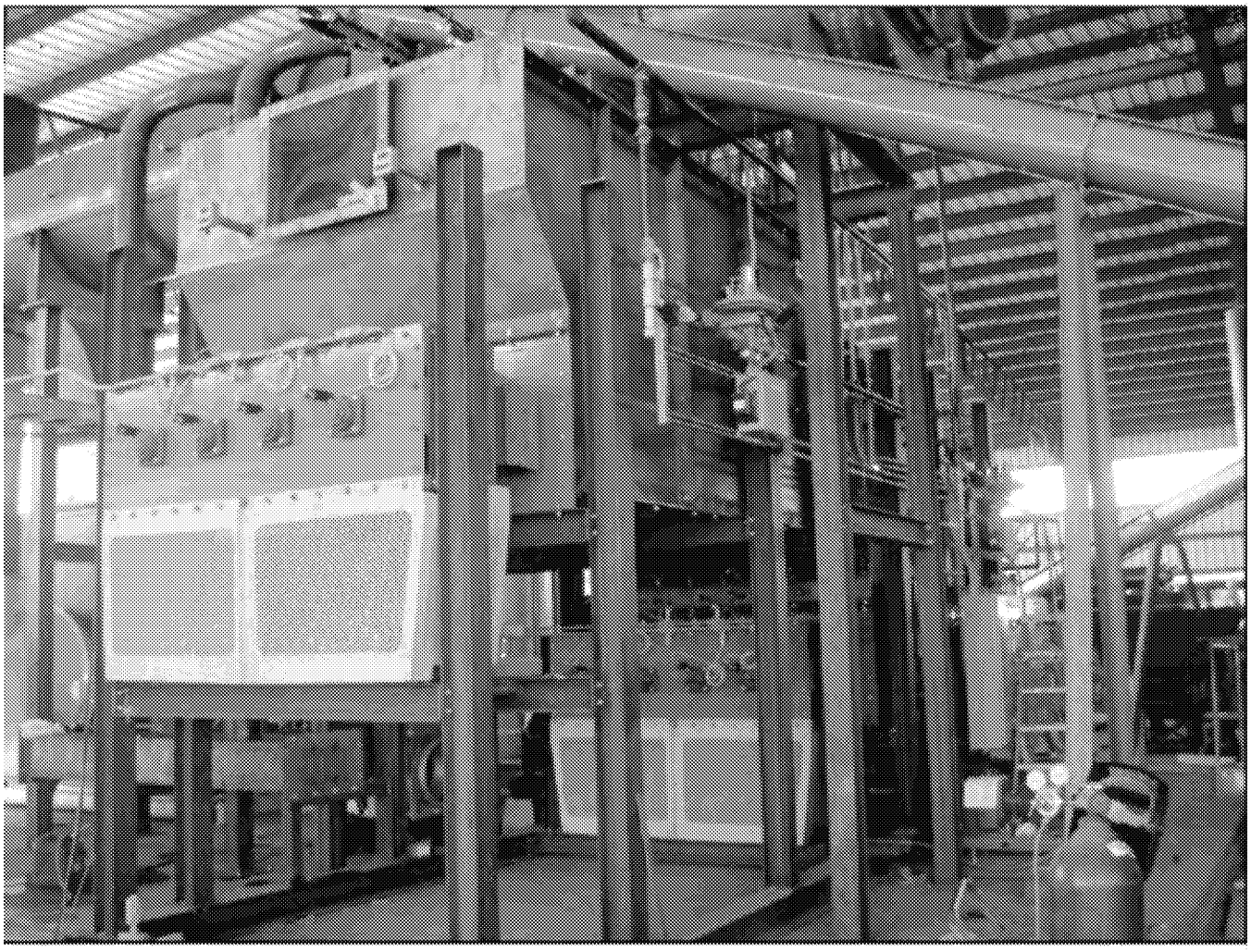


Process flow of Coaltec Energy's manure gasification system

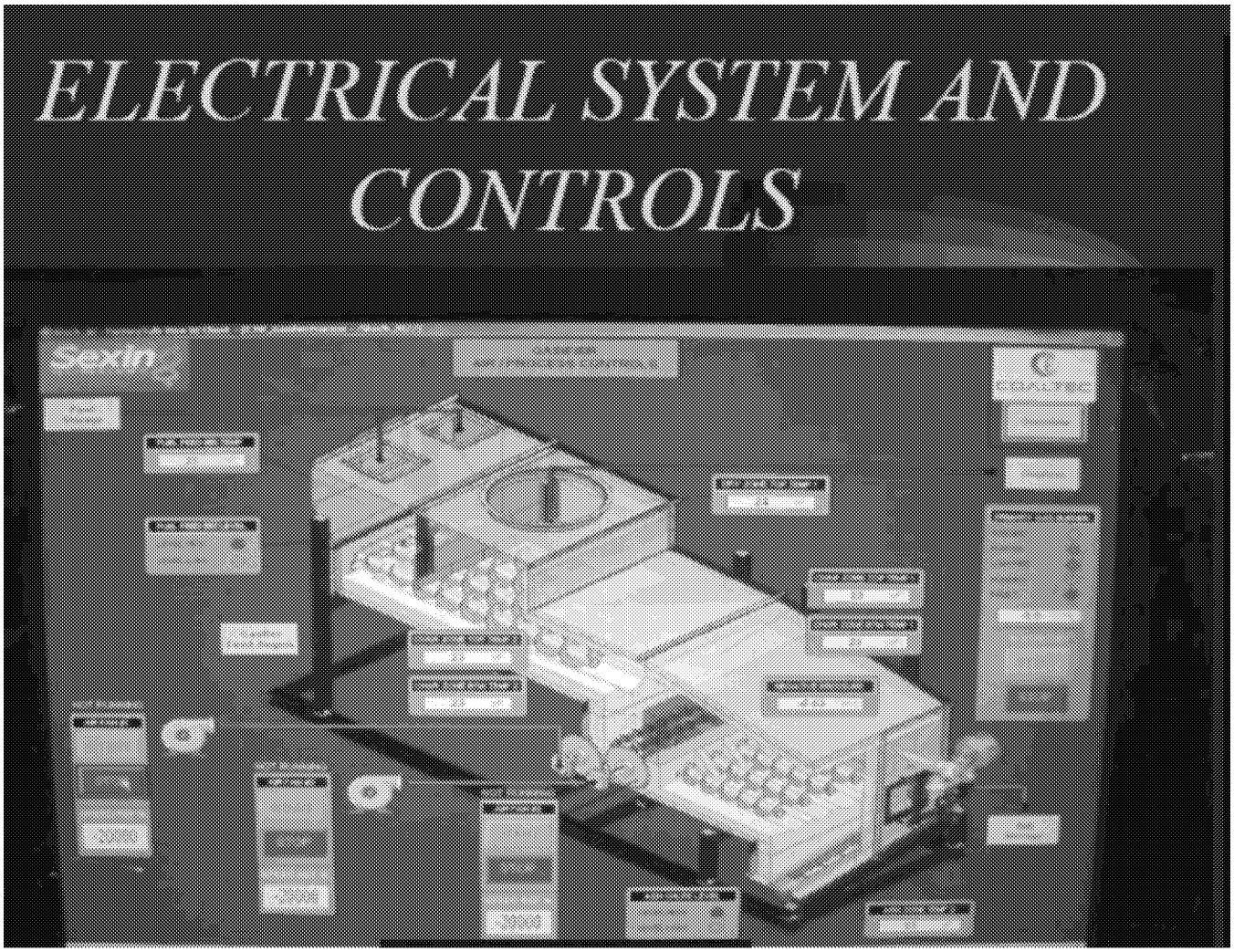
Enclosure 9.5



Exterior of the lower section of the gasifier / thermal oxidizer at The Ohio Heifer Center Clark County, Ohio (2012)



Exterior of the upper section of the Coaltec gasifier at The Ohio Heifer Center Clark County, Ohio (2012)



Camera photo of the operator's touch screen at The Ohio Heifer Center
Clark County, Ohio (2012)

Photo taken during 2016 installation of the Coaltec gasification system in Limburg Province, Netherlands where we dry and process hog manure solids from ~75 million gallons of raw hog waste per year at a regional manure processing facility. This photo shows the white refractory lining.

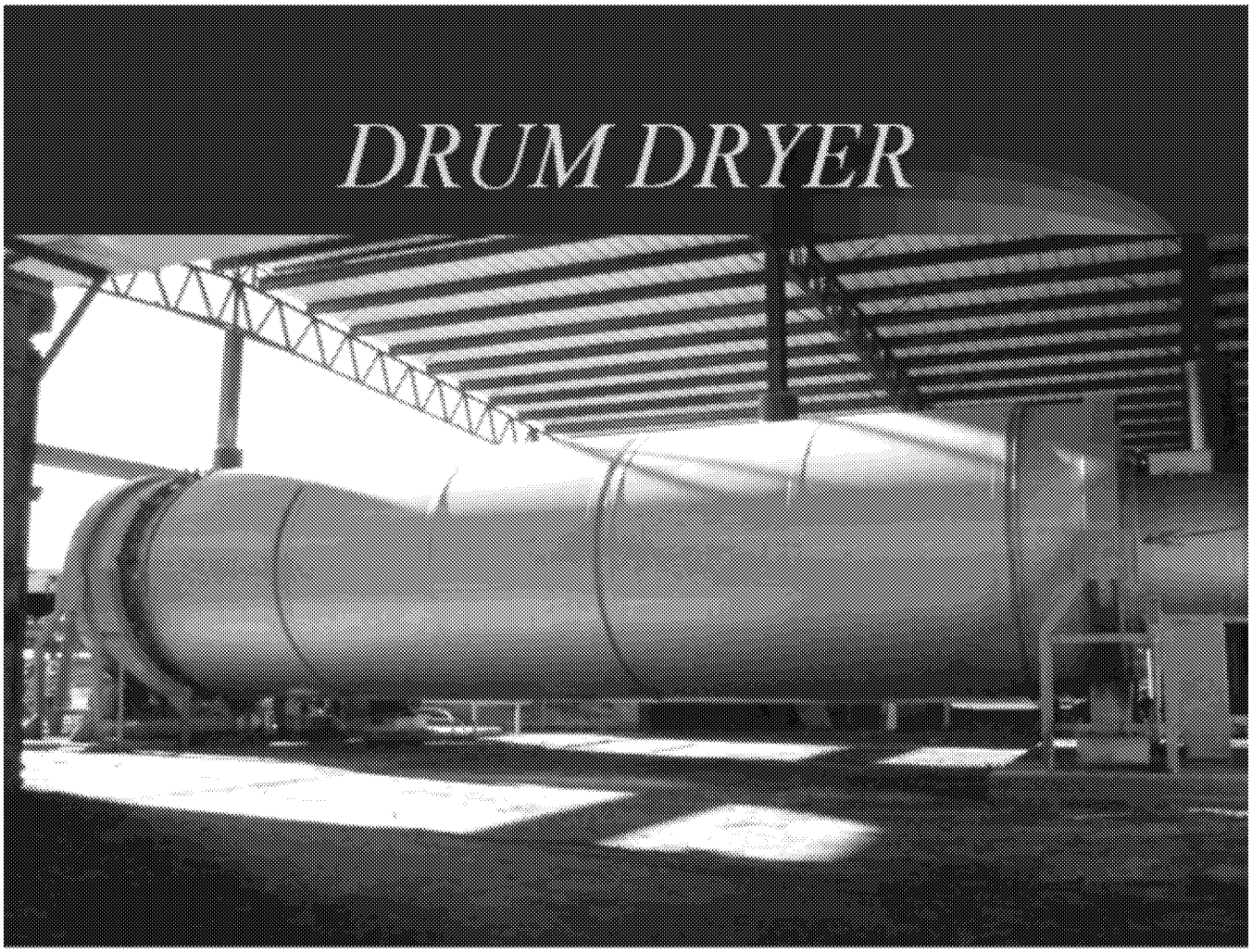


Photo of the triple-pass rotary drum dryer at The Ohio Heifer Center, Clark County, Ohio. Using a portion of the waste heat from the Coaltec gasification system, this rotary drum dryer produces approximately 20,000 tons of pathogen-free bedding per year for the cows from the raw manure.

GE Energy

Feed-in rate of 2,600 lbs. / hour

SUMMARY OF RESULTS (2009)

Complete test results are given in Section 6.0. The results for the tests conducted are summarized in the following table:

Parameter		Gasifier Outlet Duct
Total Particulate	grains/dscf	0.0106
	lb/hr	1.772
Filterable Particulate	grains/dscf	0.0098
	lb/hr	1.445
Condensable Particulate	grains/dscf	0.0007
	lb/hr	0.109
Dioxin, TEQ total	grams/hr	4.07E-07
HCl	lb/hr	0.726
Cadmium	lb/hr	< 7.86E-07
Lead	lb/hr	2.49E-05
Mercury	lb/hr	< 4.19E-06
HO_X	ppmvd	8.2
	lb/hr	1.02
SO_2	ppmvd	5.7
	lb/hr	0.64
CO	ppmvd	0.00
	lb/hr	0.000
VOC as C_3H_8	ppmvd	0.79
	lb/hr	0.09